$$\Delta \sim \frac{Mc}{eH_0} u_{\parallel} \sim 10 \text{ cm}, \quad \frac{u_{\parallel}}{v_a} \gtrsim 1.$$

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GAS-LIQUID COEXISTENCE CURVE FOR SULFUR HEXAFLUORIDE NEAR ITS CRITICAL POINT

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Several recent papers [1-5] discuss the form of the coexistence curve near the critical point. The authors of these papers attempt to derive an equation for the coexistence curve near the critical point, with allowance for the higher terms in the series expansion of $(\partial p/\partial v)_T$. Thus, for example, Giterman [6] derived an equation for the coexistence curve near the critical point by using the singularity observed by Voronel' [7,8] in the behavior of C_v near the critical point.

The authors obtained exact data on the gas-liquid equilibrium of sulfur hexafluoride in the temperature interval $T_{cr} - T \cong 0.001 - 0.800°C$. The investigations were made with previously-described apparatus [9], which was improved to increase the experimental accuracy.

The sulfur hexafluoride used in the work was purified with a specially constructed high-pressure rectification column and its purity was not lower than 99.995%.

The absolute temperature was measured with a platinum precision resistance thermometer accurate to ±0.005°C. The change in temperature was measured with a Beckman thermometer calibrated against a platinum thermometer, with accuracy ±0.001 - 0.002°C. The Beckman thermometer was enclosed in a thermostatically controlled jacket to eliminate errors connected with the projecting mercury column. The thermometer error due to variation of atmospheric pressure did not exceed ±0.001°C. The temperature at which one of the phases vanished was determined visually with accuracy ±0.001 - 0.002°C. The accuracy of the volumetric measurements was ±0.05%. The critical molar volume was determined accurate to ±0.2% visually. The meniscus on the gas-liquid boundary vanished at the center of the tube (at rather strong opalescence) only at a molar volume 198.0 ± 0.4 cm^3/mole. At a lower (higher) molar volume the meniscus vanished in the upper (lower) part of the tube. There was practically no gravitational effect, since the measuring tube (inside diameter ~10 mm) was mounted horizontally. The content of the tube was stirred magnetically.

Table I lists the critical parameters of SF_6 as obtained by the authors and by others.

Table I

Critical parameters of SF_6

T_{cr}, °C	P_{cr}, kg/cm^2	v_{cr}, cm^3/mole	Literature
45.560 ± 0.005	38.328 ± 0.005	198.0 ± 0.4	Authors
45.547 ± 0.005	38.337 ± 0.003	200	[10]
45.555 ± 0.005	-	194.4	[11]
45.58	38.32	199	[12]

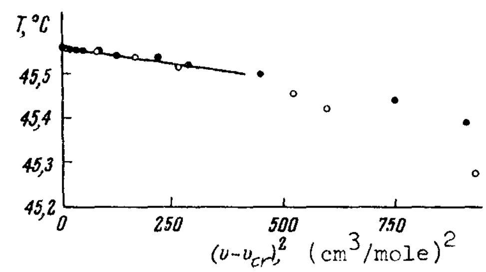

Fig. 1

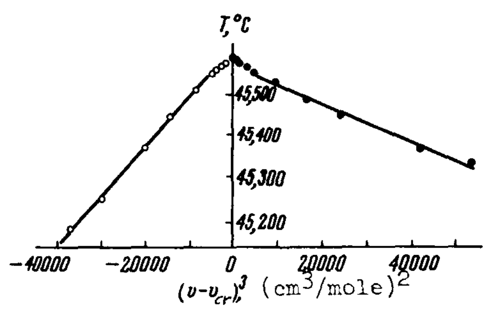

Fig. 2

The data obtained were plotted in T vs. $(v - v_{cr})^2$ and T vs $(v - v_{cr})^3$ coordinates (see Figs. 1 and 2). The coexistence curve of SF_6 (Fig. 1) in the interval $T_{cr} - T \cong 0.000 - 0.050$°C is given by the equation $T - T_{cr} = \alpha(v - v_{cr})^2$ with an error not exceeding the measurement error. Consequently, the coexistence curve is a second-degree parabola symmetrical about the axis, in good agreement with the deductions of the classical theory of critical phenomena [13]. Thus, the linear-diameter rule is satisfied in the indicated temperature region.

On going farther than 0.050°C from the critical point, the shape of the coexistence curve is strongly altered. First, it becomes asymmetrical, making it possible to determine the exact critical volume by the linear-diameter rule. In addition, the $T - T_{cr} = \alpha(v - v_{cr})^2$ curve changes smoothly into a $T - T_{cr} = \beta(v - v_{cr})^3$ curve. The coexistence curve stays in this form up to $T_{cr} - T \cong 0.5$°C. The left and right branches of the coexistence curves are determined by equations of the same form, and only the constant β, which characterizes the slope of the T vs. $(v - v_{cr})^2$ curve, changes (Fig. 2).

To obtain a single equation for the coexistence curve near the critical point it is necessary to take into account higher terms in the series expansion of the function $(\partial p/\partial v)_T$, a task beyond the scope of our paper.

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LARGE MAGNETIZATION JUMPS IN IRRADIATED MOLYBDENUM PERMALLOY

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We report below the results of an investigation of the influence of neutron irradiation on the magnetization curve of permalloy with composition 79% Ni, 4% Mo, and 17% Fe. The sample was a bundle of 30 wires ~20 mm long and 50 μ diameter each, placed in a beryllium-oxide capillary for protection against mechanical damage.

Prior to irradiation, the samples were annealed for four hours at 1350°C and cooled with the oven. The coercive force of the samples annealed in this manner was ~0.15 Oe. The annealing prior to irradiation, the subsequent heat treatment, and the irradiation of the samples were all in an argon atmosphere.

The magnetization curves (hysteresis loops) of the samples were obtained with a vibration magnetometer, which differs from the known Foner magnetometer [1] in that it contains a